

WHAT IS CLAIMED IS:

1. A crystal forming apparatus comprising:
 - a plate having a site adapted to hold a screening solution; and
 - a film adjacent to the plate, wherein the film seals the site, and wherein the film is adapted to contain a precipitant solution inside the site with an air gap between the screening solution and the precipitant solution.
2. The apparatus of claim 1, wherein the plate is a microplate, and wherein the site is a well of the microplate.
3. The apparatus of claim 2, wherein the well has an upper rim and wherein the apparatus further comprises a sealant on the upper rim that seals the film to the well.
4. The apparatus of claim 3, wherein the sealant is selected from a group consisting of a malleable sealant with adhesive properties, a gasket with adhesive properties, an adhesive, grease, oil, a gasket, and a combination thereof.
5. The apparatus of claim 2, wherein the film is supported by a frame that mounts over the microplate.
6. The apparatus of claim 2, further comprising:
 - a sample of screening solution in the well; and
 - a sample of precipitant solution held by the film and suspended over the sample of screening solution.
7. The apparatus of claim 1, wherein the film is a first film,
 - wherein the plate comprises a second film supported by a first support structure,

wherein the first film is supported by a second support structure, wherein the second support structure is disposed on top of the second film, wherein the first film is disposed on a side of the second support structure opposite the second film, and wherein the second support structure and the first film are adapted to seal the site.

8. The apparatus of claim 7, wherein the second film has a hydrophobic mask adapted to hold the precipitant solution and the screening solution apart.

9. The apparatus of claim 7, wherein the second support structure comprises a lattice having a first through-hole, a second through-hole, and a passageway connecting the first through-hole to the second through-hole.

10. The apparatus of claim 9, further comprising a sample of screening solution disposed in the first through-hole and a sample of precipitant solution disposed in the second through-hole.

11. The apparatus of claim 9, wherein the site comprises the first through-hole, the second through-hole, and the passageway.

12. The apparatus of claim 9, wherein the lattice has a third through-hole, a fourth through-hole, a second passageway connecting the second through-hole to the third through-hole, a third passageway connecting the third through-hole to the fourth through-hole, and a fourth passageway connecting the fourth through-hole to the first through-hole.

13. The apparatus of claim 12, further comprising a sample of precipitant solution disposed in the first through-hole, a first sample of screening solution disposed in the second through-hole, a second sample of screening solution disposed in the third through-hole, and a third sample of screening solution disposed in the fourth through-hole.

14. A method for forming crystals comprising:

depositing a screening solution into a well of a microplate;
depositing a precipitant solution onto a film; and
placing the film over the well such that the precipitant solution is suspended over the screening solution.

15. The method of claim 14, wherein the film is sealed to the well.

16. The method of claim 15, wherein the film is sealed to the well with a sealant between the film and the well.

17. The method of claim 14, wherein placing the film includes inverting the film.

18. The method of claim 14, wherein the film includes a hydrophobic mask and the precipitant solution is contained within the hydrophobic mask.

19. A crystal forming apparatus comprising:

a microplate having wells adapted to receive a screening solution; and
a film bonded to a frame, wherein the frame is coupled to the microplate such that the film seals the wells, and wherein the film is adapted to receive a precipitant solution.

20. The apparatus of claim 19, further comprising a layer of grease between the film and the wells.

21. The apparatus of claim 19, wherein the film has a hydrophobic mask adapted to hold samples of the precipitant solution within the wells.

22. The apparatus of claim 19, further comprising:

a sample of the screening solution in a well; and

a sample of the precipitant solution held by the film within the well and suspended over the screening solution with an air gap between the precipitant solution and the screening solution.

23. A crystal forming apparatus comprising:

a first film supported by a first support structure, wherein the first film is adapted to receive a screening solution and a precipitant solution;

a second film supported by a second support structure, wherein the second support structure is adjacent to the first film, wherein the second film is on a side of the second support structure opposite the first film, and wherein the first film, the second film, and the second support structure are adapted to seal the screening solution and the precipitant solution within a site with an air gap between the screening solution and the precipitant solution.

24. The apparatus of claim 23, wherein the first film has a hydrophobic mask adapted to hold the screening solution and the precipitant solution at distinct subsites within the site.

25. The apparatus of claim 24, wherein the distinct subsites are aligned with through-holes in the second support structure.

26. The apparatus of claim 23, wherein the second support structure comprises a lattice structure having a first through-hole, a second through-hole, and a passageway connecting the first through-hole to the second through-hole.

27. The apparatus of claim 26, further comprising a sample of screening solution disposed in the first through-hole and a sample of precipitant solution disposed in the second through-hole.

28. The apparatus of claim 27, wherein the sample of screening solution and the sample of precipitant solution are in contact with the first film and the second film in a sandwich drop configuration.

29. The apparatus of claim 26, wherein the first support structure comprises a lattice structure having a third through-hole aligned with the first through-hole of the second support structure and a fourth through-hole aligned with the second through-hole of the second support structure.

30. The apparatus of claim 23, wherein the second support structure is bonded to the first film and the second film using a sealant selected from a group consisting of a malleable sealant with adhesive properties, a gasket with adhesive properties, an adhesive, grease, oil, a gasket, and a combination thereof.

31. The apparatus of claim 30, wherein the first support structure is bonded to the first film using a sealant selected from a group consisting of a malleable sealant with adhesive properties, a gasket with adhesive properties, an adhesive, grease, oil, a gasket, and a combination thereof.

32. The apparatus of claim 23, wherein the first film and the second film are transparent to electromagnetic radiation.

33. A method for forming crystals comprising:

depositing a screening solution onto a first film;

depositing a precipitant solution onto the first film proximate to the screening solution;

sealing the screening solution and the precipitant solution within a site between the first film and a second film; and

providing, within the site, an air gap between the screening solution and the precipitant solution.

34. The method of claim 33, further comprising determining whether crystals are present.
35. The method of claim 34, wherein determining whether crystals are present comprises using an automated detection system.
36. The method of claim 35, wherein the automated detection system uses one of electromagnetic radiation and x-rays as a means of detection.
37. The method of claim 33, wherein sealing the screening solution and the precipitant solution comprises:
- supporting the second film with a lattice structure having a first through-hole, a second through-hole, and a passageway connecting the first through-hole and the second through-hole;
 - disposing the screening solution within the first through-hole;
 - disposing the precipitant solution within the second through-hole; and
 - sealing the first film and the second film to opposite sides of the lattice structure.
38. The method of claim 33, further comprising containing the screening solution and the precipitant solution within a hydrophobic mask on the first film.
39. The method of claim 33, wherein sealing the screening solution and the precipitant solution comprises placing the second film over the first film with a support structure separating the first film from the second film.
40. The method of claim 33, wherein sealing the screening solution and the precipitant solution comprises inverting the first film and placing the first film over the second film.
41. The method of claim 40, further comprising containing the screening solution and the precipitant solution within a hydrophobic mask on the first film.

42. The method of claim 41, wherein the hydrophobic mask holds the screening solution and the precipitant solution at locations on the first film aligned with through-holes of a support structure that supports the second film.

43. A method for identifying solutions that enable crystal growth of a compound comprising:

depositing a plurality of screening solutions into wells of a microplate;

depositing a plurality of precipitant samples onto a film at positions corresponding to the wells of the microplate, wherein each precipitant sample comprises a mixture of a solution of the compound and the screening solution in the corresponding well; and

placing the film over the microplate such that the precipitant samples are suspended over their corresponding wells.

44. The method of claim 43, further comprising observing at least a portion of the plurality of precipitant samples through the film to determine if crystal growth has occurred.

45. A method for identifying solutions that enable crystal growth of a compound comprising:

depositing a plurality of screening solutions onto a first film at discrete sites;

depositing a plurality of precipitant samples onto the first film, wherein each individual precipitant sample of the plurality of precipitant samples is adjacent to a corresponding screening solution at its discrete site, and wherein each individual precipitant sample comprises a mixture of a solution of the compound and the corresponding screening solution;

placing a second film over the first film such that the plurality of precipitant solutions and the plurality of screening solutions contact the second film;

sealing each individual precipitant sample and its corresponding screening solution within its discrete site; and

providing, at each discrete site, an air passage between the individual precipitant sample and its corresponding screening solution.

46. The method of claim 45, further comprising scanning the discrete sites to identify sites with crystals.

47. The method of claim 46, wherein the discrete sites are scanned with one of electromagnetic radiation and x-rays.

48. A method for identifying solutions that enable crystal growth of a compound comprising:

providing a first film with a plurality of discrete sites, wherein each discrete site contains two or more subsites;

depositing a plurality of screening solutions onto the first film at one or more subsites of each discrete site;

depositing a plurality of precipitant solutions onto the first film at one or more subsites of each discrete site, such that the one or more subsites of each discrete site contain at least one precipitant sample and at least one screening sample, wherein the at least one precipitant sample comprises a mixture of the solution of the compound and the at least one screening sample;

placing a second film over the first film such that the plurality of precipitant solutions and the plurality of screening solutions contact the second film;

at each discrete site, sealing the at least one precipitant sample and the at least one screening sample within its discrete site; and

providing an air passage between the subsites of each discrete site.

49. The method of claim 47, further comprising scanning the plurality of discrete sites to identify sites with crystals.

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50. The method of claim 49, wherein the plurality of discrete sites is scanned with one of electromagnetic radiation and x-rays.